

WHAT IS CLAIMED IS:

1               1. A headliner assembly for a vehicle, the headliner assembly  
2 comprising:

3               a headliner body having first and second surfaces, the first surface  
4 being configured to face toward a roof of the vehicle and the second surface being  
5 disposed opposite the first surface; and

6               a flexible air duct attached to the first surface, the flexible air duct  
7 having an inlet for receiving pressurized air and a duct portion that channels the  
8 pressurized air;

9               wherein the flexible air duct inflates when air is provided through the  
10 inlet and at least partially deflates when air is not provided through the inlet.

1               2. The headliner assembly of claim 1 wherein the flexible air  
2 duct includes a first flexible layer that inhibits air leakage and a second flexible layer  
3 attached to and thicker than the first flexible layer, the second flexible layer being  
4 partially compressed to increase density of the second flexible layer and to maintain  
5 a desired shape when air is not provided through the inlet.

1               3. The headliner assembly of claim 2 wherein the first flexible  
2 layer is a polyethylene film.

1               4. The headliner assembly of claim 2 wherein the second flexible  
2 layer is a lofted polyester material.

1               5. The headliner assembly of claim 2 wherein the second flexible  
2 layer is a woven material.

1               6. The headliner assembly of claim 1 further comprising a  
2 support member for supporting a section of the flexible air duct when the flexible  
3 air duct is at least partially deflated.

1                   7.     The headliner assembly of claim 1 wherein the flexible air  
2 duct is attached to the first surface by an adhesive.

1                   8.     The headliner assembly of claim 1 wherein the flexible air  
2 duct is attached to the first surface by vibration welding.

1                   9.     The headliner assembly of claim 1 further comprising a vent  
2 aperture extending through the headliner body that receives pressurized air from the  
3 flexible air duct.

1                   10.   A headliner assembly for a vehicle, the headliner assembly  
2 comprising:

3                   a headliner body having a plurality of material layers disposed  
4 substantially parallel to each other, the headliner body including:

5                   an upper surface disposable adjacent to a vehicle roof;  
6                   a lower surface disposed opposite the upper surface;  
7                   a vent aperture disposed in the plurality of material layers; and  
8                   a speaker disposed in the plurality of material layers; and  
9                   a flexible air duct having a perimeter attached to the upper surface to  
10 define an air conduit;

11                  wherein the flexible air duct is configured to inhibit resonance in  
12 response to an audio signal from the speaker.

1                   11.    The headliner assembly of claim 10 wherein the flexible air  
2 duct is inflated when pressurized air is provided through an inlet and partially  
3 deflated when pressurized air is not provided through the inlet.

1                   12.    The headliner assembly of claim 11 wherein the flexible air  
2 duct inhibits noise transmission when deflated.

1                   13.    The headliner assembly of claim 10 wherein the flexible air  
2 duct has a first flexible layer for inhibiting air leakage and a second flexible layer

3        disposed opposite the first flexible layer, the second flexible layer having a  
4        perimeter attached to the upper surface to define the air conduit.

1                14.        The headliner assembly of claim 13 wherein the second layer  
2        is partially compressed to retain a predetermined shape.

1                15.        A headliner assembly for a vehicle, the headliner assembly  
2        comprising:

3                        a headliner body including:  
4                                a first surface disposed adjacent to a roof of the vehicle;  
5                                a second surface disposed opposite the first surface; and  
6                                a vent aperture passing through the first and second surfaces;

7        and

8                        a flexible body including:  
9                                a flexible insulation layer for providing acoustic insulation;  
10                                and  
11                                a flexible barrier layer for inhibiting air leakage disposed  
12                                between the flexible insulation layer and the first surface;  
13                                wherein a portion of the flexible barrier layer is attached to the first  
14                                surface to define a flexible air duct that inflates when air is provided through an inlet  
15                                and deflates when air is not provided through the inlet.

1                16.        The headliner assembly of claim 15 wherein the flexible  
2        insulation layer covers substantially all of the first surface of the headliner body.

1                17.        The headliner assembly of claim 15 wherein the flexible  
2        barrier layer is disposed on a section of the flexible insulation layer.

1                18.        The headliner assembly of claim 15 wherein an area of the  
2        flexible barrier layer located apart from the flexible air duct is perforated.

1                   19. The headliner assembly of claim 15 wherein the flexible  
2 insulation layer is partially compressed to retain a shape in an area adjacent to the  
3 flexible air duct.

1                   20. The headliner assembly of claim 15 further comprising a  
2 speaker disposed in the headliner body wherein the flexible body does not resonate  
3 in response to an audio signal from the speaker.